

# Work Order ID 72039

Monday, July 18, 2011 11:17:42 AM



Page 1

Item ID: D212-664-101TRN

Revision ID: ~~U/R~~ *10*

Item Name: Crosstube Turning Detail

Start Date: 7/18/2011 Start Qty: 1.00

Required Date: 7/22/2011 Req'd Qty: 1.00

Reference:

Accept



Setup Start



Stop



Cust Item ID:

Customer:

Approvals:

Process Plan: *U*

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-141

Rev D *U/R* *11/07/29*

100



Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

0.00

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA113

2-Turn first side as per Folio FA113

3-Blend transition lines only, \*\*do not sand whole tube\*\*:

\*Use mill bastard file, brush file repeatedly with file card.

\*Do not use sandpaper coarser than 320 grit.

110



QC

Quality Control

QC1- Inspect dimensions to dimension sheet

0.00

Memo

0.00

*SL 11-07-25*

*10*  
*MM-2 11/07/19*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 72039

Monday, July 18, 2011 11:17:42 AM



Page 2

Item ID: D212-664-101TRN  
Revision ID: U/R  
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Accept



Setup Start



Stop



Start Date: 7/18/2011 Start Qty: 1.00



Required Date: 7/22/2011 Req'd Qty: 1.00



Cust Item ID:

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID Tool # Plan  
Code Accept Reject Reject Insp.  
Qty Qty Number Stamp

120



Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

0.00

0.00

1-Turn second side as per Folio FA113

2-Blend transition lines only. \*\*do not sand whole tube\*\*:

\*Use mill bastard file, brush file repeatedly with file card.

\*Do not use sandpaper coarser than 320 grit.

3-Remove sand and plugs

130



QC

Quality Control

QC1- Inspect dimensions to dimension sheet

0.00

Memo

0.00

140



QC

Quality Control

QC8- Inspect parts - second check

0.00

Memo

0.00

M.M.L 11/07/20

S 11-07-25

Jeff 11.07.25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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**Work Order ID 72039**

Monday, July 18, 2011 11:17:42 AM



Page 4

Item ID: D212-664-101TRN

Accept



Setup Start

**Work Order ID 72039**

Monday, July 18, 2011 11:17:42 AM



Page 3

Item ID: D212-664-101TRN

Accept



Setup Start



Revision ID: U/R

Item Name: Crosstube Turning Detail

Stop



Start Date: 7/18/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 7/22/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

SAP  
Ac 1107.25

1

0

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

DP

11-7-25

170

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and Stock in kanban rack  
Location:

46

DP

11-7-25

①

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

H:\FORMS\Quality Assurance\approved QANCRWO RevE

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**NOTE:** Date & initial all entries

H:\FORMS\Quality Assurance\approved QANCRWO RevE

# Picklist Print

Monday, July 18, 2011 11:17:39 AM

Page 1

Work Order ID: 72039

Parent Item: D212-664-101TRN

Parent Item Name: Crosstube Turning Detail



Start Date: 7/18/2011

Required Date: 7/22/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A 08-03-06 new issue DD verified by:ec  
IPP Rev B 08.04.02 removed Polish EC verified by: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D6005-128

Manufactured No

120

Each

0.0000

1

1



Crosstube Material



D6005-180

B59307

1 mm. 11/07/20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 72039
<b>Description:</b> Crosstube Assembly (205/212/412 High Fwd)		<b>Part Number:</b> D212-664-141
<b>Inspection Dwg:</b> D212-664-141 <b>Rev:</b> D		<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.210	✓		vern	JF-01
	R0.063	+/-0.010	.063	✓		RG	
	2.740	+0.005/-0.000	2.743	✓		vern	JF-01
	5.097	+/-0.030	5.095	✓		II	
	2.304	+0.005/-0.000	2.309	✓		micr	CNC-04
	2.340	+0.005/-0.000	2.345	✓		II	
	2.398	+0.005/-0.000	2.403	✓		II	
	2.448	+0.005/-0.000	2.453	✓		II	
	2.498	+0.005/-0.000	2.503	✓		II	
	2.549	+0.005/-0.000	2.553	✓		II	
	2.599	+0.005/-0.000	2.603	✓		II	
	2.671	+0.005/-0.000	2.676	✓		II	
	2.701	+0.005/-0.000	2.706	✓		II	
SIDE B	0.200	+/-0.010	.210	✓		vern	JF-01
	R0.063	+/-0.010	.063	✓		RG	
	2.740	+0.005/-0.000	2.743	✓		vern	JF-01
	5.097	+/-0.030	5.095	✓		II	
	2.304	+0.005/-0.000	2.309	✓		micr	CNC-04
	2.340	+0.005/-0.000	2.345	✓		II	
	2.398	+0.005/-0.000	2.403	✓		II	
	2.448	+0.005/-0.000	2.453	✓		II	
	2.498	+0.005/-0.000	2.503	✓		II	
	2.549	+0.005/-0.000	2.554	✓		II	
	2.599	+0.005/-0.000	2.604	✓		II	
	2.671	+0.005/-0.000	2.676	✓		II	
	2.701	+0.005/-0.000	2.706	✓		II	
	126.514	+/-0.020	126.520	✓		tape	mmk-02

<b>Measured by:</b> [Signature]	<b>Audited by:</b> [Signature]	<b>Prototype Approval:</b>	N/A
<b>Date:</b> 11/07/19	<b>Date:</b> 11-07-25	<b>Date:</b>	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-101)	KJ/JLM	
B	06.03.15	Tolerance revised for 5.097 per Dwg Rev update	KJ/JLM	
C	07.05.28	Dwg Rev updated	KJ/JLM	
D	10.02.02	Dimension 126.514 was 126.51	KJ	[Signature]



8 7 6 5 4 3 2 1



Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

#### GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6005-128  
FINISHED LENGTH = 126.514±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS
- WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)  
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

11/07/29

UNDER REVIEW

11.16.15  
FOR PRE-SEALING SHEET

DEO ATTACHED

RELEASED  
2009-10-29

D	REFORMAT/REVISE GENERAL NOTES/PART LIST: REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE, TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	PH	DRAWING NO.	REV. D
MFG. APPR.	PH	D212-664-141	SHEET 1 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR FOR ANY REASON WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD.	

72039

8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

8 7 6 5 4 3 2 1

12 13 15  
D2893-1 SUPPORT  
MS21920-25 CLAMP, 2X  
D3595-063-450 RUBBER CUSHION, 2X  
2 PL

A4-2

A

14.00 (-141)  
OR 13.75 (-141B)

D

D212-664-501  
BENT TUBE

SYM

**D212-664-141/-141B**  
**ASSEMBLY DETAIL**

D

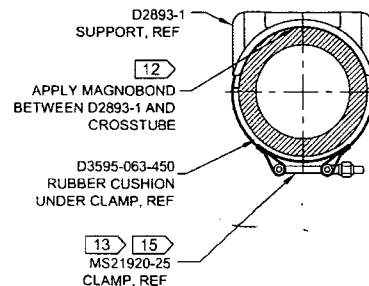
*4/07/29*

UNDER REVIEW

*4/11/06/13*

DEO ATTACHED

RELEASED  
2009-10-29



**SECTION A-A**  
SCALE 4X

D5-2

*72039*

DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. D
MFG. APPR.	18	D212-664-141	SHEET 2 OF 4
APPROVED	12	TITLE	SCALE
DE APPR.	12	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
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8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
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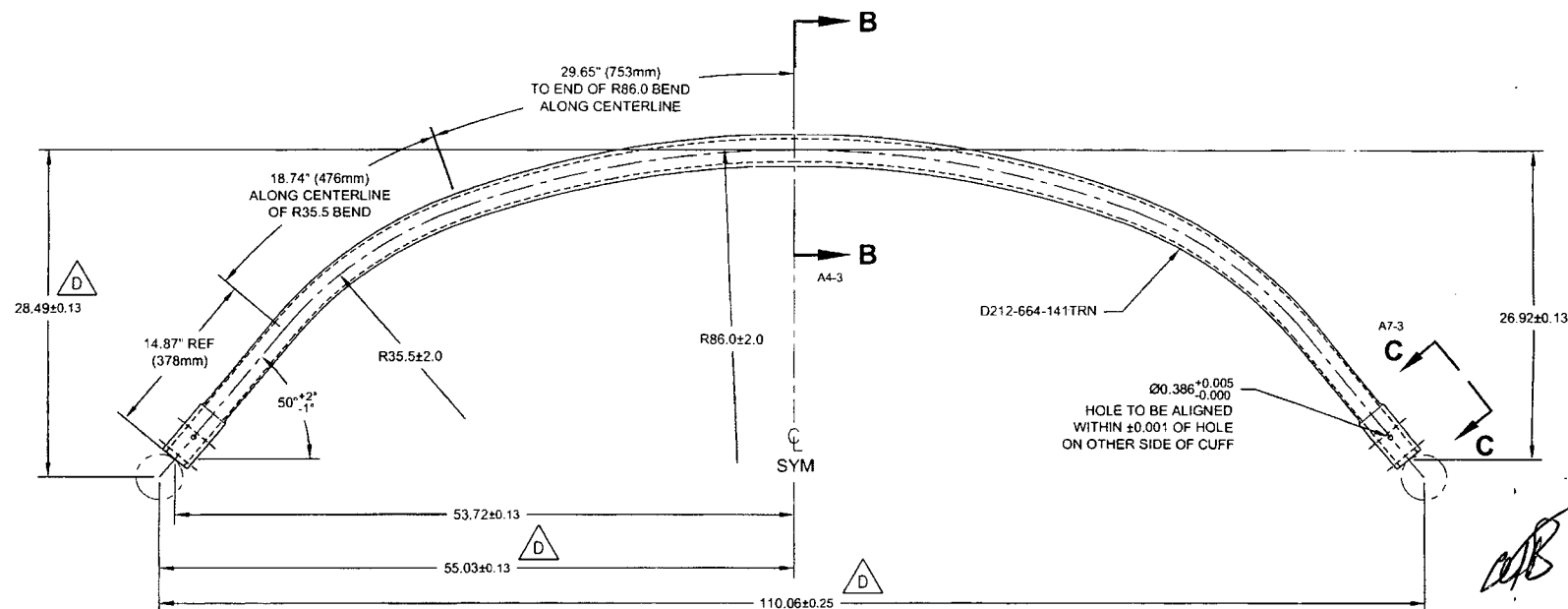
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

6 7 6 5 4 3 2 1



**D212-664-501**  
**BENDING AND DRILLING DETAIL**



*11/07/29*

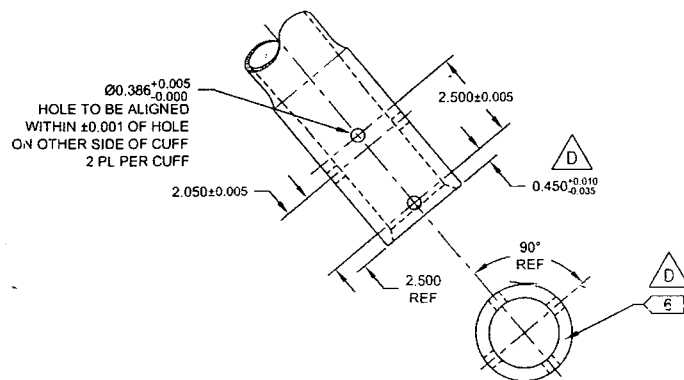
**UNDER REVIEW**

*06.13*

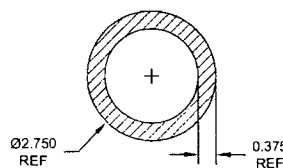
**DEO ATTACHED**

**RELEASED**

2009-10-29



**VIEW C-C: CUFF DETAIL** C2-3  
SCALE 3X



**SECTION B-B** C4-3  
SCALE 4X

*72039*

DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. D
MFG. APPR.	AS	D212-664-141	SHEET 3 OF 4
APPROVED	AP	TITLE	SCALE
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DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	UP	MFG. APPR.	APPROVED	DE APPR.		
DATE 11.04.07	DATE 11.03.11		DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

**PURPOSE:**

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

**CHANGE:**

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND  
PAINT OUTSIDE PER DART QSI 005 4.2  
REMOVE MASKING AND APPLY CLEAR COAT

**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2

**RELEASED**  
2011-04-18

**UNDER REVIEW**

11.05.13

11/07/29

22039

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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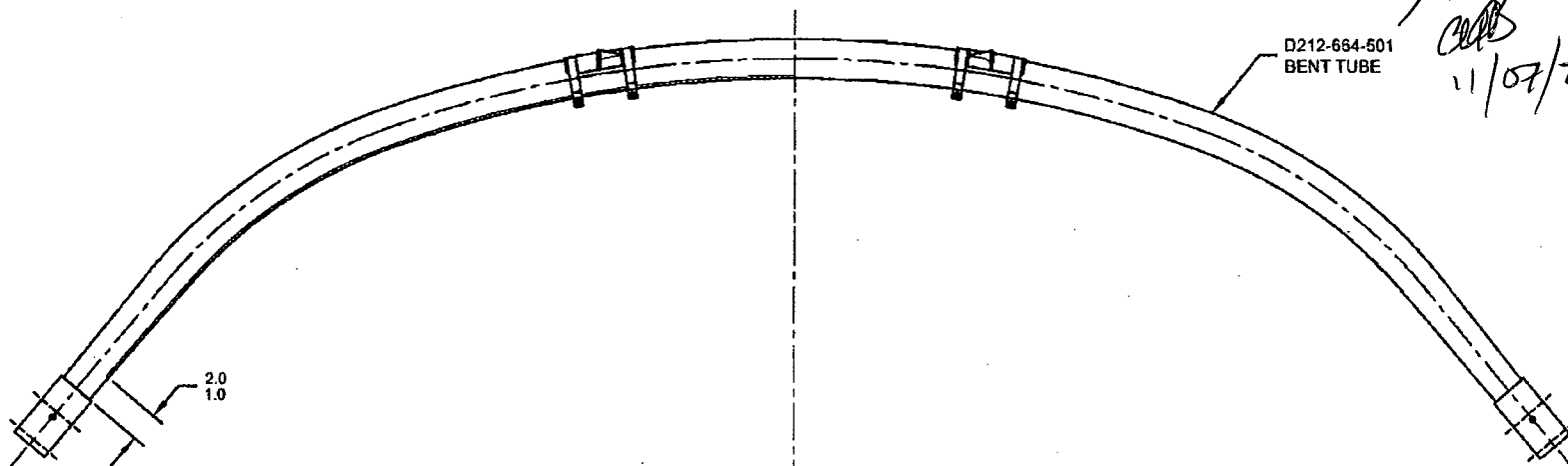
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DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.		
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

IS:

WAS:

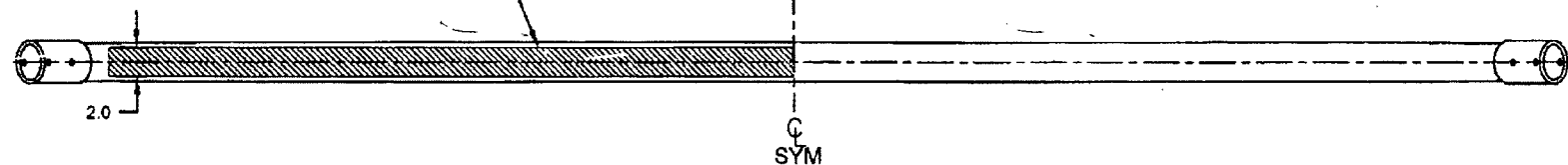
**UNDER REVIEW**

D212-664-501  
BENT TUBE



**D212-664-141/-141B  
ASSEMBLY DETAIL**

MASK AREA PRIOR TO PAINTING.  
REMOVE MASKING AFTER PAINT  
AND APPLY CLEAR COAT



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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries